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AMSAT NEWS SERVICE
ANS-030

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor [at] amsat.org

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ANS-030 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2022 Jan 30

AMSAT□s GOLF-TEE CubeSat de-manifested from launch on ELaNa-46

NASA has de-manifested GOLF-TEE from the ELaNa-46 mission at the request of AMSAT. ELaNa-46 was expected to launch no earlier than 2022. COVID-related restrictions and supply chain disruptions, affecting both AMSAT□s vendors and team, have put AMSAT□s ability to meet the mission integration timeline at high risk.

AMSAT Vice-President Engineering Jerry Buxton, N0JY, described some of the reasons for this decision:
□ AMSAT finds itself in a similar situation to what other payloads and space-industry providers are experiencing. The worldwide pandemic and supply chain shortages are threatening everyone□s ability to properly and successfully deliver for launches.
□ Out of respect for NASA, the launch provider, and other payloads, it

is important to withdraw now, rather than later or, even worst, missing a launch integration deadline, which has possible financial penalty implications.
□ GOLF-TEE and GOLF-1 have both been selected to participate in NASA□s CubeSat Launch Initiative program, and NASA will continue to look for another launch for GOLF-TEE.

AMSAT□s GOLF program plays an important role in AMSAT□s return to highly elliptical orbits. In addition to proving the maneuverability capabilities required by current and proposed orbital debris regulations, the GOLF program will work through a series of increasingly capable spacecraft to develop skills and learn systems for which we do not yet have the necessary low-risk experience. Among these are active attitude control, deployable/steerable solar panels, radiation tolerance for Commercial off the Shelf (COTS) components in higher orbits, and propulsion.

The TEE designation in GOLF-TEE stands for □Technology Exploration Environment□ and reflects GOLF-TEE□s mission goal to test two critical systems needed for higher orbits. The first is an Attitude Determination and Control System (ADCS) that will allow active pointing of high gain satellite antennas, provide accurate attitude adjustments in future missions with maneuverability systems, and allow pointing the fixed solar panel array for best solar power in any given orbit type. The second is the Radiation-Tolerant Integrated Housekeeping Unit (RTIHU), which will allow AMSAT to gain initial orbit and space radiation exposure for radiation event-induced fault tolerant systems designed using COTS components. GOLF-TEE□s RTIHU includes a command transceiver, and its design is based on the Hercules line of ARM architecture-based microcontrollers.

GOLF-TEE will also evaluate a low-cost, deployable, fixed attitude, solar panel array design as part of AMSAT Engineering□s exploration of fixed panel arrays that allow for outfitting a variable number of □wings□ in order to best match the power requirements of various CubeSat missions.

Additionally, GOLF-TEE will carry a modified Ettus E310 commercial software-defined radio (SDR), as an experimental package, to test the high speed data downlink in the 10 GHz band and a parrot V/x mode linear transponder to provide users with an opportunity to experiment with the 10 GHz microwave downlink. GOLF-TEE will also carry a legacy V/u linear transponder.

GOLF-1 will build on technology and lessons learned from the GOLF-TEE mission; however, it will be a return to STEM-based educational missions, including hosted student radiation and imaging experiments in collaboration with AMSAT□s educational partners. GOLF-1 will require a more comprehensive de-orbiting plan and hardware that are in compliance with NASA□s NPR 8715.6 NASA Procedural Requirements for Limiting Orbital Debris in order to be manifested on an ELaNa launch to the high altitude AMSAT is seeking.

A significant amount of funding is necessary to complete the development and construction of the GOLF series of CubeSats. Please consider a donation today. Donations designated for the AMSAT GOLF program may be made at https://www.amsat.org/donations/amsat-golf-program-donations/

[ANS thanks Robert Bankston, KE4AL, President AMSAT for the above information]

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https://www.amsat.org/join-the-amsat-presidents-club/
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Details of the decoded telemetry and voice, as well as more details in:
https://www.amsat-ea.org/ (Texts are In Spanish)

And in the following Twitter threads:
EASAT-2 transmissions:
https://twitter.com/ea4gpz/status/1482457631566487553
EASAT-2 decodings by Gabriel Otero:
https://twitter.com/gaoterop/status/1482758196037050382
HADES transmissions:
https://twitter.com/ea4gpz/status/1482696274797338625.

[ANS thanks Felix Paez, EA4GQS, AMSAT-EA Mission Manager and AMSAT News Service for the above information]

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Need new satellite antennas? Purchase Arrows, Alaskan Arrows,
and M2 LEO-Packs from the AMSAT Store. When you purchase through
AMSAT, a portion of the proceeds goes towards
Keeping Amateur Radio in Space.
https://amsat.org/product-category/hardware/

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Svalbard QO-100 Satellite DX-Pedition Announced

The very first Svalbard QO-100 Satellite DX-Pedition will take place April 22-24, 2022 from Kapp Linné Isfjord Radio at 78° North. ON4CKM Cedric, ON5UR Max and ON4DCU Patrick will take up the challenge and travel to Kapp Linné and stay there for 3 days, trying to be active 24 hours a day via the Qatar-OSCAR 100 satellite. They will operate two QO-100 satellite stations under the callsigns JW0W and JW100QO, while JW0X will be used by another team for contacts on shortwave.

With QO-100 only 3° above the horizon, Kap Linné was the only suitable place in the area with Svalbard at the edge of the satellite footprint. Looking for a suitable location to stay and getting there, is one of the biggest challenges and cost drivers for the team. This is indeed a very unique opportunity to work this rare location and DXCC via satellite. And if they are lucky, they might also be able to contact DP0GVN at the german antarctic research Neumayer-Station III for the North/South distance record via QO-100. The team is seeking donations. Additional information and graphics may be found at: https://bit.ly/3KLZsJI.

[ANS thanks Peter Gülzow, DB2OS, President AMSAT-DL for the above information]

Orbital Mechanics for New and Experienced Satellite Operators

Bob Meyers, WA8FXQ posted a useful link he discovered in the most recent Orbital Index. It is particularly good for those who want a better understanding of fundamental behind GPS.

The link's author, Bartosz Ciechanowski, is a blogger who focuses on explorations of physics, math, and engineering. His animations couple with his straight forward explanations to create a clear view of each topic he tackles. His current blog post is focused on the principles behind GPS systems, however in the process of explaining how GPS systems work, he tackles orbital mechnics and the relationship of orbital altitude to radio footprint of satellites. His excellent animations make it possible for him to present the rather complicated mathematics visually and without requiring the viewer to have a strong mathematical background. His blog on the GPS

system may be seen at: https://ciechanow.ski/gps/. He is also a Patreon creator and fields questions and discussions on that platform.

[ANS thanks Bob Meyers, WA8FXQ and The Orbital Index for the above information]

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The next mode change to voice cross band repeater is expected to occur in late January/early February 2022.

The latest information on the operation mode can be found at https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors for the above information]

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Clint Bradford, K6LCS, AMSAT Ambassador gave his "Getting Started"
presentation last June to a great club on the east coast - now they want
MORE! The club has asked for a speaker to cover working the linear
satellites. EME is of interest to them too!

Clint would appreciate help finding a Zoom-capable speaker. For further
details,
please contact Clint Bradford, K6CLS at:
Email: clintbradford [at] mac DOT com or 951-533-4984 - cell

+ ARRL National Convention
 February 10-13, 2022
 DoubleTree by Hilton Orlando at SeaWorld
 10100 International Dr, Orlando, FL 32821

+ Orlando HamCation
 February 11-13, 2022
 Central Florida Fairgrounds and Expo Park
 4603 West Colonial Drive
 Orlando, Florida 32808

+ CubeSat Developers Workshop
 April 26"28, 2022
 San Luis Obispo, CA

+ Hamvention 2022
 May 20, 2022 to May 22, 2022
 Greene County Fairgrounds and Expo Center
 210 Fairground Road
 Xenia, Ohio 45385
 https://www.hamvention.org

+ 2022 Rocky Mountain ARRL Division Convention
 October 7, 2022 - October 9, 2022
 Event Center at Archer
 3921 Archer Pkwy
 Cheyenne, Wyoming 82007
 https://wyhamcon.org/site.

Clint Bradford K6CLS, AMSAT Ambassador writes: "I have a really great club
needing a speaker specializing in SSB, and touching on EME. They were given
my "Getting Started" presentation last year, and want MORE!
An East Coast club
 meets on Wednesdays

Please send me a private email message if you"re ready to Zoom!"
Write to: Clint Bradford K6LCS Email: clintbradford AT mac DOT com
951-533-4984 - cell

[ANS thanks Paul Overn, KE0PBR, AMSAT Events page manager, for the above
information]

Satellite Shorts From All Over

+ A Martian carbon biosignature? Not content to be overshadowed by the
newer, shinier Perseverance, Curiosity has roved and drilled on (for nearly
10 years now). A paper and NASA summary both report (appropriately
conservatively) on tantalizing new evidence from the rover of potential
biosignatures in Gale crater. Curiosity"s SAM lab heated 24 different
powdered rock samples to 850° C, releasing their solid carbon as methane
gas. The onboard Tunable Laser Spectrometer then measured the carbon

isotopes in that gas and found more 12C than would be expected based on the 12C-to-13C ratio in the modern Martian atmosphere. On Earth, life preferentially uses 12C over the heavier 13C, bioaccumulating it, so that we observe significantly more 12C than 13C in ancient rocks where life grew. Did ancient Martian microbial methanogenesis concentrate this isotope at Gale crater as it built up complex organic molecules? Maybe. Two other hypotheses offer abiotic explanations: one suggests that UV light could have caused CO2 in the Martian atmosphere to form isotopically enriched carbon monoxide molecules that settled to the surface, the other wonders if the isotopes arrived from space when our solar system drifted through a 13C-depleted giant molecular cloud hundreds of millions of years ago. It's also possible that the Martian atmospheric concentration changed over time for some unknown reason. "On Earth, processes that would produce the carbon signal we're detecting on Mars are biological," but we don't understand the Martian carbon cycle well enough yet to have any real confidence. As with other tantalizing results about microbial extraterrestrial life, this will probably just turn out to be a physicochemical process we don't yet understand. Or maybe not. See https://go.nasa.gov/35vE0IQ and http://bit.ly/3IIKpyF for details. [ANS thanks NASA and The Orbital Index for the above information]

+ Reaching the tipping point for 3D printing satellites: The number of 3D-printed parts on board satellites is growing amid advances in additive manufacturing. Satellite shops are embracing the technology to cut costs and accelerate production for increasingly capable spacecraft. Advances are paving the way to a future where satellites can print parts in orbit. But how close is the industry to 3D printing entire satellites? It's a tricky question, not least because the number of parts on a satellite differs greatly depending on its size and complexity, and range from simple foundational structures to intricate semiconductors. "Cubesat parts can number in the hundreds of components while larger satellites can range from tens of thousands to hundreds of thousands" for flagship missions such as the just-launched $10 billion James Webb Space Telescope, said Emile de Rijk, CEO of additive manufacturing specialist Swissto12. But just five years ago, the "use of 3D printed structures was largely experimental with very few parts being flown in missions and payloads that had a healthy risk appetite," according to de Rijk. Now, nearly all satellites built today have at least some 3D printed parts, he says, although most are still relatively simple mechanical bracketing systems for keeping a spacecraft's structure together. More information may be found at: https://bit.ly/3g3sWod. [ANS thanks Jason Rainbow at SpaceNews.com for the above information]

+ SpaceX rocket on collision course with moon: A rocket launched by Elon Musk's space exploration company is on course to crash into the Moon and explode. The Falcon 9 booster was launched in 2015 but after completing its mission, it did not have enough fuel to return towards Earth and instead remained in space. Astronomer Jonathan McDowell told BBC News it will be the first known uncontrolled rocket collision with the Moon, but the effects will be minor. The rocket was abandoned in high orbit seven years ago after it completed a mission to send a space weather satellite on a million-mile journey. It was part of Elon Musk's space exploration programme SpaceX, a commercial company that ultimately aims to get humans living on other planets. See https://bbc.in/3o4bpRa for the full story. [ANS thanks Georgina Rannard of BBC News for the above information]

+ NASA to name astronauts this year for first Artemis moon mission: NASA will announce later this year the four astronauts who will slingshot around the far side of the moon on the Artemis lunar program's first crew mission, currently scheduled for launch in 2024, the head of the agency's human space exploration division recently said. The crew is expected to include three U.S. fliers and one Canadian astronaut. The Artemis 2 mission will follow two years after NASA's Artemis 1 test flight, an unpiloted pathfinder mission scheduled to launch no earlier than March from Kennedy Space Center in Florida. Artemis 1 will be the first flight of NASA's Space Launch

System, a heavy-lift rocket designed for lunar missions that□s been in development for more than a decade. It will also be first trip by NASA□s Orion crew capsule to the moon, following a demonstration flight that orbited Earth in 2014. The goal of NASA□s Artemis program is to land astronauts on the moon□s surface for the first time since the final Apollo lunar mission in December 1972. The Artemis program□s first attempt to land a crew on the moon is penciled in for the Artemis 3 mission, scheduled for 2025, with a derivative of the Starship vehicle SpaceX□s is developing in South Texas. More info is available at: https://bit.ly/3L0nGQG. [ANS thanks Stephen Clark of Spaceflight Now for the above information]

+ Two New Satellite Distance Records Claimed: An initial distance record has been claimed on HO-113. A65GC (@farangov) worked @F4DXV on 13-Jan-2022 at 19:52 UTC - a distance of 5,298 km. Earlier in the month a new distance record has been claimed on AO-109. @ES4RM in KO49al completed a SSB QSO with @F4DXV in JN04iu on 22-Dec-2021 at 15:24 UTC - a distance of 2,445 km. See https://amsat.org/satellite-distance-records/. [ANS thanks Paul Stoetzer, N8HM, Executive Vice President of the Radio Amateur Satellite Corporation (AMSAT) and ANS Editor for the above information]

Join AMSAT today at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
* Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Jack Spitznagel, KD4IZ
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